



N – 1049

Seat No.	
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T.E. (Electrical) (Semester – V) (New) Examination, 2010
DIGITAL SIGNAL PROCESSING

Day and Date: Friday, 14-5-2010
Time: 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Note : Attempt any three questions from each Section.

SECTION – I

1. a) Obtain the expression showing relation between the N-point DFT and Z – transform. 8
b) Explain with reference to Frequency response the effect of upsampling and downsampling. 8
2. a) Explain use of DFT in Linear filtering. 8
b) Obtain the convolution using overlap and add method. 8
If $X(n) = [1, 1, 1, 1, 2, 2, 2, 2]$
and $h(n) = [1, 2, 3]$
3. a) Why Bit- Reversal algorithm is required in DIT-FFT algorithm? Explain the advantage of FFT algorithm in calculation of DFT. 8
b) Compute DFT of $X(n)$ using DIT-FFT algorithm if $X(n) = [1, 2, 1, 2, 1, 2, 1, 2]$. 8
4. a) Using DFT and IDFT obtain circular convolution of.
 $X(n) = [1, 2, 3, 4]$ and $h(n) = [1, 1, 2, 2]$ 10
b) Explain Nyquist rate and advantages of sampling rate conversion. 8

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SECTION - II

5. a) Obtain the direct form structure - I, II and cascade and parallel form for $H(z)$ given as

$$H(z) = \frac{(Z+2)}{Z^2 + 8Z + 15} \quad 12$$

- b) Explain 'Windowing' in FIR filter and comment on Kaiser Window. 6

6. a) Design a digital filter using impulse invariant method if $H(s) = \frac{2}{(s+1)(s+2)}$ and sampling frequency is 5 Hz. 8

- b) Discuss advantages of digital filtering over analog filtering. 8

7. a) Design a second order Butterworth High Pass filter using BLT method if -
Cut off frequency is - 1 KHz
Sampling frequency is - 10 KHz 8

- b) Explain the Bus structure in DSP processor. 8

8. a) Explain designing of FIR filter using frequency sampling method. 8

- b) Explain the arithmetic errors in digital filters with example. 8

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